

## CLAIMS

We Claim:

1. A fuel injector nozzle assembly comprising.  
an injector body including a valve seat with a supply passage through which fuel flows generally along a supply axis, said valve seat presenting an upper surface adapted to engage a valve to seal said supply passage; and  
a nozzle plate mounted onto said valve seat including a plurality of orifice holes therein through which fuel flows;  
said valve seat further including a first edge protrusion, protruding into the fuel flow for generating a first separation of the fuel flow, thereby creating a plurality of small eddies which are entrained within the fuel flowing adjacent thereto;  
a turbulence cavity defined by said nozzle plate and said valve seat wherein fuel flows into said turbulence cavity through said supply passage and out from said turbulence cavity through said plurality of orifice holes.

2. The fuel injector nozzle assembly of claim 1 wherein said first edge protrusion comprises a circumferential lip section of said valve seat defining said supply passage therein.

3. The fuel injector nozzle assembly of claim 1 wherein said nozzle plate is made from metal and is welded onto said valve seat.

4. The fuel injector nozzle assembly of claim 3 wherein said nozzle assembly is made from stainless steel.

5. The fuel injector nozzle assembly of claim 1 wherein said nozzle plate includes a first recess formed within a top surface of said nozzle plate, wherein said turbulence cavity is defined by said first recess and said valve seat.

6. The fuel injector nozzle assembly of claim 5 wherein said first recess is circular in shape.

7. The fuel injector nozzle assembly of claim 6 wherein said plurality of orifice holes are evenly distributed along a circular pattern, said circular pattern having a diameter smaller than said first recess, such that said orifice holes are in fluid communication with said turbulence cavity.

8. The fuel injector nozzle assembly of claim 7 wherein said circular pattern is concentric with said first recess.

9. The fuel injector nozzle assembly of claim 5 wherein said plurality of orifice holes are evenly distributed along an oval pattern within said first recess, such that said orifice holes are in fluid communication with said turbulence cavity.

10. The fuel injector nozzle assembly of claim 1 wherein said orifice holes are round.

11. The fuel injector nozzle assembly of claim 10 wherein said orifice holes are conical in shape.

12. The fuel injector nozzle assembly of claim 11 wherein each of said orifice holes includes a center line, said center line being parallel to said supply axis.

13. The fuel injector nozzle assembly of claim 11 wherein each of said orifice holes includes a center line, said center line being skewed relative to said supply axis.

14. The fuel injector nozzle assembly of claim 1 wherein said valve seat includes a second recess, wherein said nozzle plate is shaped such that said nozzle plate is received within said second recess.

15. The fuel injector nozzle assembly of claim 14 wherein said second recess and said nozzle plate are circular in shape.

16. The fuel injector nozzle assembly of claim 1 wherein said nozzle plate includes a second edge protrusion protruding into the fuel flow for generating a second separation of the fuel flow, thereby creating a plurality of small eddies which are entrained within the fuel flowing adjacent thereto.

17. The fuel injector nozzle assembly of claim 16 wherein said second edge protrusion is defined by a channel within said nozzle plate immediately adjacent to said orifice holes.

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18. A fuel injector nozzle assembly comprising:

an injector body including a valve seat with a supply passage through which fuel flows generally along a supply axis, said valve seat presenting an upper surface adapted to engage a valve to seal said supply passage; and

a nozzle plate mounted onto said valve seat including a plurality of round conical orifice holes therein through which fuel flows;

said valve seat further including a first edge protrusion, protruding into the fuel flow for generating a first separation of the fuel flow, thereby creating a plurality of small eddies which are entrained within the fuel flowing adjacent thereto, said first edge protrusion defined by a circumferential lip section of said valve seat defining said supply passage therein;

a turbulence cavity defined by said nozzle plate and said valve seat wherein fuel flows into said turbulence cavity through said supply passage and out from said turbulence cavity through said plurality of orifice holes;

said nozzle plate further including a second edge protrusion protruding into the fuel flow for generating a second separation of the fuel flow, thereby creating a plurality of small eddies which are entrained within the fuel flowing adjacent thereto, said second edge protrusion defined by a channel within said nozzle plate immediately adjacent said orifice holes.

19. The fuel injector nozzle assembly of claim 18 wherein said nozzle plate is made from metal and is welded onto said valve seat.

20. The fuel injector nozzle assembly of claim 19 wherein said nozzle assembly is made from stainless steel

21. The fuel injector nozzle assembly of claim 18 wherein said nozzle plate includes a first recess formed within a top surface of said nozzle plate, wherein said turbulence cavity is defined by said first recess and said valve seat.

22. The fuel injector nozzle assembly of claim 21 wherein said first recess is circular in shape.

23. The fuel injector nozzle assembly of claim 22 wherein said plurality of orifice holes are evenly distributed along a circular pattern, said circular pattern having a diameter smaller than said first recess, such that said orifice holes are in fluid communication with said turbulence cavity.

24. The fuel injector nozzle assembly of claim 23 wherein said circular pattern is concentric with said first recess.

25. The fuel injector nozzle assembly of claim 21 wherein said plurality of orifice holes are evenly distributed along an oval pattern within said first recess, such that said orifice holes are in fluid communication with said turbulence cavity.

26. The fuel injector nozzle assembly of claim 18 wherein each of said orifice holes includes a center line, said center line being parallel to said supply axis.

27. The fuel injector nozzle assembly of claim 18 wherein each of said orifice holes includes a center line, said center line being skewed relative to said supply axis.

28. The fuel injector nozzle assembly of claim 18 wherein said valve seat includes a second recess, wherein said nozzle plate is shaped such that said nozzle plate is received within said second recess.

29. The fuel injector nozzle assembly of claim 28 wherein said second recess and said nozzle plate are circular in shape.

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